## **INTERNATIONAL SEARCH REPORT**

IB2004/050816

| A. CLASSIF  | CATION OF SUBJECT MATTER  | ,      |                       |  |  |  |  |  |  |  |
|---|---|--|-----------------------|--|--|--|--|--|--|--|
| IPC 7   | H01J31/12   |  |                       |  |  |  |  |  |  |  |
| -   |   |  |                       |  |  |  |  |  |  |  |
| According to  | International Patent Classification (IPC) or to both national classificatio   | n and IPC                                    |                       |  |  |  |  |  |  |  |
| B. FIELDS S   |   |  |                       |  |  |  |  |  |  |  |
|   | cumentation searched (classification system followed by classification  | symbols)                                     |                       |  |  |  |  |  |  |  |
| IPC 7 HO1J  |   |  |                       |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
| Documentati   | on searched other than minimum documentation to the extent that such  | n documents are included in the fields searc | hed                   |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
| Electronic da   | ata base consulted during the international search (name of data base   | and, where practical, search terms used)     |                       |  |  |  |  |  |  |  |
| EPO-Int   | ternal, PAJ, WPI Data   |  |                       |  |  |  |  |  |  |  |
|   |   |  | ·                     |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
| C DOCUME  | ENTS CONSIDERED TO BE RELEVANT  |  |                       |  |  |  |  |  |  |  |
| Category °  | Citation of document, with indication, where appropriate, of the relev  | ant passages                                 | Relevant to claim No. |  |  |  |  |  |  |  |
| Category  | Oldright of document, min wascards if miner appropriate   |  |                       |  |  |  |  |  |  |  |
| х   | US 4 703 231 A (NISHIDA JUN ET AL   | )  | 1,7                   |  |  |  |  |  |  |  |
| <b>  ^</b>  | 27 October 1987 (1987-10-27)  |  | ŕ                     |  |  |  |  |  |  |  |
| Α   | column 6, lines 1-45; figure 5  |  | 2-6,8,9               |  |  |  |  |  |  |  |
|   | US 6 411 020 B1 (ROBINDER RONALD C  | HARLES                                       | 1-9                   |  |  |  |  |  |  |  |
| A   | ET AL) 25 June 2002 (2002-06-25)  | MAKEES                                       | • •                   |  |  |  |  |  |  |  |
| Ì   | claim 1; figure 10  |  |                       |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
| A,  | US 5 189 335 A (SEKIHARA TOSHINOBU  | J EI AL)                                     | 1-9                   |  |  |  |  |  |  |  |
|   | 23 February 1993 (1993-02-23) cited in the application  |  |                       |  |  |  |  |  |  |  |
|   | columns 3-4, lines 60-12; figure 2  |  |                       |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
| G   | ,   |  | '                     |  |  |  |  |  |  |  |
|   |   | į.   |                       |  |  |  |  |  |  |  |
| } ·   |   |  | •                     |  |  |  |  |  |  |  |
|   |   |  |                       |  |  |  |  |  |  |  |
| Further documents are listed in the continuation of box C.  |   |  |                       |  |  |  |  |  |  |  |
| Special categories of cited documents:  |   |  |                       |  |  |  |  |  |  |  |
| *A* document defining the general state of the art which is not cited to understand the principle or theory underlying the  |   |  |                       |  |  |  |  |  |  |  |
| considered to be of particular relevance invention  *E* earlier document but published on or after the international   *X* document of particular relevance; the claimed invention  |   |  |                       |  |  |  |  |  |  |  |
| filing date  cannot be considered novel or cannot be considered to  "L" document which may throw doubts on priority claim(s) or  involve an inventive step when the document is taken alone   |   |  |                       |  |  |  |  |  |  |  |
| which is cited to establish the publication date of another citation or other special reason (as specified)  "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the |   |  |                       |  |  |  |  |  |  |  |
| "O" docur   | "O" document referring to an oral disclosure, use, exhibition or document is combined with none or more other such document |  |                       |  |  |  |  |  |  |  |
| *P* docur   | 'P' document published prior to the international filing date but   |  |                       |  |  |  |  |  |  |  |
|   | and the priority date statistics  | *&" document member of the same patent for   |                       |  |  |  |  |  |  |  |
| Date of the actual completion of the international search  Date of mailing of the international search report   |   |  |                       |  |  |  |  |  |  |  |
| 26 October 2004 05/11/2004  |   |  |                       |  |  |  |  |  |  |  |
| Name and  | d malling address of the ISA  | Authorized officer                           |                       |  |  |  |  |  |  |  |
|   | European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Riiswlik   |  |                       |  |  |  |  |  |  |  |
|   | Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.<br>Fax: (+31-70) 340-3016  |  |                       |  |  |  |  |  |  |  |

## INTERNATIONAL SEARCH REPORT

## IB2004/050816

| Patent document cited in search report |    | Publication date |     | Patent family<br>member(s) | Publication<br>date |
|--|----|------------------|-----|----------------------------|---------------------|
| US 4703231                             | A  | 27-10-1987       | JP  | 1751799 C                  | 08-04-1993          |
| 03 4703231                             | Λ  | 27 10 150.       | ĴΡ  | 4033195 B                  | 02-06-1992          |
|  |    |                  | JP  | 61202592 A                 | 08-09-1986          |
|  |    |                  | ĴΡ  | 61010836 A                 | 18-01-1986          |
|  |    |                  | JP  | 1740890 C                  | 15-03-1993          |
| •                                      |    |                  | ĴΡ  | 4025662 B                  | 01-05-1992          |
|  |    |                  | ĴΡ  | 61024131 A                 | 01-02-1986          |
|  |    |                  | JP  | 2021511 C                  | 19-02-1996          |
|  |    |                  | JP  | 7034356 B                  | 12-04-1995          |
|  |    |                  | JP  | 61107638 A                 | 26-05-1986          |
| •                                      |    |                  | JP  | 61107639 A                 | 26-05-1986          |
|  |    |                  | US  | 4752721 A                  | 21-06-1988          |
| US 6411020                             | B1 | 25-06-2002       | US  | 6441543 B1                 | 27-08-2002          |
| 03 0411020                             | DI | 25 00 2002       | ÜS  | 2002060517 A1              | 23-05-2002          |
|  |    |                  | ÜS  | 2004017140 A1              | 29-01-2004          |
|  |    |                  | CA  | 2319395 A1                 | 05-08-1999          |
|  |    |                  | CN  | 1295717 T                  | 16-05-2001          |
|  |    |                  | EP  | 1057198 A1                 | 06-12-2000          |
|  |    |                  | ĴΡ  | 2002502092 T               | 22-01-2002          |
|  |    |                  | WO  | 9939361 A1                 | 05-08-1999          |
| US 5189335                             | A  | 23-02-1993       | JP  | 2830190 B2                 | 02-12-1998          |
| 02 2102323                             | ^  |                  | JP  | 3134942 A                  | 07-06-1991          |
|  |    |                  | KR. | 9307368 B1                 | 09-08-1993          |